

1 ABSTRACT OF THE DISCLOSURE

 An optical semiconductor device includes an
SiC substrate having an n-type conductivity, and an
AlGaN buffer layer having an n-type conductivity
5 formed on the SiC substrate with a composition
represented as $\text{Al}_x\text{Ga}_{1-x}\text{N}$, wherein the AlGaN buffer
layer has a carrier density in the range between $3 \times$
 10^{18} - $1 \times 10^{20} \text{cm}^{-3}$, and the compositional parameter x
is larger than 0 but smaller than 0.4 ($0 < x < 0.4$).

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